Restricted Circulation

This paper is not an official document; it is for information only and reference cannot be made to it in any printed publication without the permission of the author.

Agricultural Memorandum No.419

Spore release of Barley Mildew

L P SMITH

An analysis of the spore catch of barley mildew at Plant Path. Lab. during May and June 1971 was made with reference to current weather.

It was assumed that the release was affected by, temperature, sunshine and the previous amount released. Making a rough correction for temperature and sunshine and then averaging the daily catches against amount already counted; it was found:

Range (of previous catch)	Mean Catch
0-1500	94
750-3000	235
1500-5000	356
3000-7000	585
5000-9000	594
7000-11000	807
9000-13000	902
11000-15000	905
13000-17000	1207
15000-19000	1020
17000 and above	1114

These figures approximate to
$C = 90N$ (N=1 to N=10)
$C = 25N + 650$
(N=10 or more)
where C = catch
N = previous catch in 1000 units

Effect of temperature The catches can now be adjusted for spore potential by correcting with respect to a mean figure of 500. The resulting figures were averaged in respect to the sum of the maximum air temperature on the day of catch and the previous day maxima. The results were:

Range of summed maxima	Mean adjusted catch
23-27	280
24-28	301
25-29	327
26-30	393
27-31	382
28-32	429
29-33	473
30-34	485
31-35	407
32-36	462
33-37	597
34-38	704
35-39	856
36-40	970
37-41	1120
38-42	1615

These figures suggest that:

There is a drop of 30 for each degree below 35, and a rise of 140 for each degree above.

15348/JEB/12/71/60

Effect of sunshine The catches can now be adjusted to a standard of 35, and re-averaged with respect to sunshine hours. The results are:

Range of sunshine hours	Mean adjusted catch
0-2	510
1-3	455
2-4	540
3-5	511
4-6	476
5-7	647
6-8	655
7-9	655
8-10	542
9-11	830
10-12	808
11-13	1310
12-14	984

These figures suggest that:

There is a drop of 25 per hour below 9 hours, and a rise of 110 per hour above

Effect of wind Re-adjusting once more (standard of 9 hours sunshine) and average against daily run-of-wind, the figures are:

Range of run-of-wind	Mean adjusted catch
50-120	520
80-140	500
100-160	580
120-180	660
140-200	760
160-220	835
180-240	815
200-260	780
220-300	1410

These figures suggest that:

There is a drop of 25 per 10 miles run-of-wind below a daily total of 210 and a rise of 100 per 10 miles above

Adjusting finally to a standard of 210 miles per day, the mean adjusted catch over 49 observations May 13 to June 30 was 875.

Estimation Model

Starting with 875 and successively adjusting for temperature, sunshine and wind using the factors determined above, finally multiplying by the reciprocal of the one used to adjust for pollen potential, it is possible to produce daily estimates of the catch using meteorological data and the total already caught. The results are as follows:

Calling catches 0-250 low
250-1000 medium
Over 1000 high

Forecast Catch	Actual Catch Low	Medium	High
Low	24	2	0
Medium	2	7	4
High	0	3	7

Days of High Pustule Counts

Dates	Pustule Count	Actual Spore Count	Estimated Spore Count
June 3 & 4	11.7	1518	1790
June 2 & 3	8.1	2013	1780
June 1 & 3	6.9	1241	980
June 23 & 24	6.6	3283	4790
June 4 & 5	5.1	772	814
June 12 & 13	4.1	1286	880

The estimates are therefore not misleading.

Any comment or criticisms on this paper should be referred to the Author.

Meteorological Office
BRACKNELL Berks

December 1971